

REMARKS

1. *Status of the Application.* Claims 1-18 were pending in the application. In the Office Action, claim 1-18 were objected to based upon a perceived lack of clarity of a certain claim term, and were rejected under 35 U.S.C. § 102 as being anticipated by cited prior art.

2. *The Claim Objections.* Claims 1-18 were objected to based on the assertion that "[t]he use of the term 'real-time' sensor data in the claim structure to define the measured data obtained by the sensors during the drilling operation is not clear...." Elaborating, the Office Action alleges that "[i]t is not clear as to just where and/or when the real-time data is detected or obtained, or if the detections [sic] of the sensor data occur during the real-time when the drill string 'is stopped' or whether the sensor data is detected while the drill string 'is turning.'"

Assignee respectfully challenges the assertion that the term "real-time" in the claims lacks clarity. Assignee's position in this regard is founded upon two primary bases: First, the term "real-time" is widely used and thoroughly understood by persons of ordinary skill in the art in the context of the subject matter of this application. As a simple search of the U.S. Patent & Trademark Office's patent database will show, seeking patents with the term "real time" appearing in the claims and the term "drill" occurring in the specification results in hundreds of examples. In none of the exemplary references reviewed by the undersigned did the patentee deem it necessary to provide any particular definition for the term "real time." This strongly supports Assignee's belief that the term "real time" is perfectly clear in the claims of the present application.

Second, while the prior art rarely if ever provides a definition of the term "real time," the Specification of the present application actually **does** provide a definition:

As used herein, the descriptor "real-time" shall be interpreted to encompass actions taken essentially immediately. "Real-time data acquisition," for example, means acquiring data reflecting the current state of operational parameters. Likewise, "real-time data processing" means immediate processing of acquired data, as opposed to situations where

data is acquired, stored, and processed at a later time. "Real-time data processing" is further to be distinguished from situations in which data is predicted in advance of an actual process and analysis of predictive data is subsequently used in conjunction with the carrying out of the process. As a related concept, the term "dynamic" as used herein shall refer to parameters and other variables whose values are subject to change over time. As a simple example, the rotational speed of a bottom-hole assembly during a drilling operation is a dynamic parameter, inasmuch as the rotational speed is subject to change for any one of a variety of reasons during a drilling operation.

Specification, p. 4, lines 3-16

In light of these factors, it is believed that there is no basis whatsoever for posing the questions set forth in the Office Action relative to the term "real-time." The application is abundantly clear as to the meaning of the term, even more so than any prior art reference that the undersigned has been able to identify.

Reconsideration and withdrawal of the objection to the claims is respectfully requested.

2. *The Section 102 Rejections.* Claims 1-18 were rejected under 35 U.S.C § 102 as being anticipated by U.S. Patent No. 5,842,149 to Harrel et al. ("*Harrel*"). As discussed below, it is respectfully submitted that the Office Action's reliance on *Harrel* in making the § 102 rejection is misplaced, and that the § 102 rejection is improper.

In particular, it is believed that the Office Action mischaracterizes the apparent teaching of *Harrel* in at least one significant respect, and that as a result of such mischaracterization(s), reaches an unjustified conclusion of anticipation.

According to the Office Action, with specific reference to each of the independent claims 1, 7, and 13, *Harrel* allegedly discloses a system and method which includes real-time acquisition of down-hole data and real-time analysis of the data. Notably, the Office Action alleges that the *Harrel* system involves "analysis" of the sensor data "to calculate at least one dynamic critical value of an operator-adjusted operational parameter of [the] bottom hole assembly. It is this latter assertion that the Assignee respectfully deems to be in error and constitutes a critical mischaracterization of *Harrel*.

The Assignee generally concedes that *Harrel* appears to disclose a system involving the real-time sensing and processing ("analysis") of data. What *Harrel* does **not** appear to teach or suggest, however, is the calculation of at least one dynamic critical value of an operator-adjustable operational parameter. Instead of the more **pro-active** and anticipatory approach disclosed and claimed in the present application, *Harrel* appears to teach a purely **reactive** approach. *Harrel* relies upon sensed data to identify "dysfunctions" in the drilling operation, as well as the relative severity of such "dysfunctions." See, e.g., *Harrel*, col. 3, lines 31-42.

This very significant distinction in the approach taken by *Harrel* and that of the present invention is readily apparent from the following passage from *Harrel*:

The system of the present invention also computes **dysfunctions** related to the drilling assembly and their **respective severity** relating to the drilling operations and transmits information about such dysfunctions and/or their severity levels to a surface control unit. The surface control unit determines the **relative corrective actions** on a display for use by the operator.

Harrel, col. 4, lines 36-44 (emphasis added).

This approach is significantly different from that of the present invention, which rather than identifying undesirable conditions ("dysfunctions" in *Harrel's* terminology) as *they occur*, the system of the present invention instead functions to calculate critical values of operational parameters *prior to* the occurrence of undesirable conditions that would occur as a result of these critical values, such that the undesirable conditions can be prevented from occurring at all, through avoidance of the computed critical conditions.

It is respectfully submitted that *Harrel* neither teaches nor suggests the computation of "critical values" as disclosed in the present application and as required by each independent claim of the application. Consequently, *Harrel* clearly neither teaches nor suggests *avoidance* of computed critical values in order to prevent undesirable conditions from occurring.

As a result of these distinctions, *Harrel* clearly does not achieve the benefits realized through the practice of the present invention, since the "dysfunctions" must first

occur before the *Harrel* system can take corrective action, thereby subjecting the BHA to undesirable conditions that would be entirely avoided by practicing the present invention.

Since each of the independent claims 1, 7, and 13 in the present application recites "calculate[ing] at least one dynamic critical value of an operator adjustable operational parameter," it is believed that each of these claims includes subject matter neither taught nor suggested by *Harrel*, subject matter that is believed to render these claims patentably distinct from *Harrel*. Reconsideration and withdrawal of the § 102 rejection of claims 1, 7, and 13 is therefore respectfully requested.

As to the remaining claims, each is dependent upon one of the dependent claims 1, 7, and 13. In light of the patentable distinction between the subject matter of the independent claims and *Harrel*, it necessarily follows that the claims dependent upon the independent claims 1, 7, and 13 likewise recite combinations of elements neither taught nor suggested by the prior art. Reconsideration and withdrawal of the § 102 rejection of claims 2-6, 8-12, and 14-18 is therefore respectfully requested.

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CONCLUSION

In view of the foregoing, Assignee respectfully submits that each of the claims now pending in the application is allowable, and that the application as a whole is in proper form and condition for allowance. If the Examiner believes that the application can be placed in even better condition for allowance, he is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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